Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of Parts 1, 21, 73, 74 and 101 of the Commission's Rules to Facilitate the Provision of Fixed and Mobile Broadband Access, Educational and Other Advanced Services in the 2150-2162 and 2500-2690 MHz Bands	)	WT Docket No. 03-66 RM-11614

FOURTH FURTHER NOTICE OF PROPOSED RULEMAKING

Adopted: May 24, 2011 **Released: May 27, 2011**

Comment Date: [30 days after publication in the Federal Register]
Reply Comment Date: [45 days after publication in the Federal Register]

By the Commission: Commissioner Baker not participating.

I. INTRODUCTION

1. In this *Fourth Further Notice of Rulemaking*, we seek comment on a proposal intended to make it possible to use wider channel bandwidths for the provision of broadband services in certain spectrum bands. Specifically, we consider changes to the out-of-band emission limits for mobile Broadband Radio Service (BRS) and Educational Broadband Service (EBS) devices operating in the 2496-2690 MHz band (2.5 GHz band). The proposed changes may permit operators to use spectrum more efficiently, and to provide higher data rates to consumers, thereby advancing key goals of the National Broadband Plan. The changes would also promote greater harmonization of FCC requirements with global standards for mobile devices in the 2.5 GHz band, potentially making equipment more affordable and furthering the development of mobile broadband devices. We seek comment on whether the proposed changes can be made without increasing the potential for harmful interference to existing users in the 2.5 GHz band and adjacent bands.

II. BACKGROUND

2. *General:* On July 29, 2004, the Commission released the *BRS/EBS R&O & FNPRM*, which fundamentally transformed the rules for the 2.5 GHz band.[1] In the *BRS/EBS R&O*, the Commission adopted a band plan that restructured the 2.5 GHz band into upper and lower-band segments for low-power operations (UBS and LBS, respectively), and a mid-band segment (MBS) for high-power operations, in order to reduce the likelihood of interference caused by incompatible uses.[2] The Commission also revised the out-of band emission limits for BRS and EBS licensees consistent with a

[1] *See* Amendment of Parts 1, 21, 73, 74 and 101 of the Commission's Rules to Facilitate the Provision of Fixed and Mobile Broadband Access, Educational and Other Advanced Services in the 2150-2162 and 2500-2690 MHz Bands, *Report and Order and Further Notice of Proposed Rulemaking*, WT Docket No. 03-66, 19 FCC Rcd 14165 (2004) (*BRS/EBS R&O* and *FNPRM* as appropriate).

[2] *Id.* at 14182-14187 ¶¶ 36-47.

proposal made by a coalition of organizations representing BRS and EBS licensees.[3] With respect to mobile devices, the Commission adopted an emission mask which requires that emissions outside the licensee's frequency bands of operation be attenuated below the transmitter power (P) by a factor of 43 + 10 log(P) decibels (dB) at the channel's edge, and 55 + 10 log(P) dB at 5.5 megahertz from the channel edge, where (P) is the transmitter power measured in watts.[4] 5.5 megahertz represents the size of individual channels in the LBS and UBS in the post-transition band plan adopted by the Commission.[5]

3. Today, the 2.5 GHz band is used by Clearwire Corporation (Clearwire) and other operators to provide wireless broadband service using the Worldwide Interoperability for Microwave Access (WiMAX) version 802.16e standard.[6] WiMAX is a wireless broadband access technology based on the Institute of Electrical and Electronics Engineers (IEEE) 802.16 standard which supports delivery of non-line-of-sight connectivity between a subscriber station and base station with a typical cell radius of 3 to 10 kilometers. WiMAX can support fixed and nomadic, as well as portable and mobile, wireless broadband applications.[7] Another standard for wireless broadband technology is Long Term Evolution (LTE), which is developed by the Third Generation Partnership Project (3GPP), a consensus-driven international partnership of telecommunications standards bodies.[8] Both IEEE and 3GPP are working to develop standards for refinements of WiMAX and LTE, which are known as WiMAX 2 (based on the 802.16m standard) and LTE-Advanced (3GPP Release 10 and beyond).[9]

4. Current WiMAX deployments typically use maximum channel bandwidths of 10 megahertz.[10] Clearwire reports that average usage for its mobile services is more than 7 GB/month.[11] Wireless broadband data usage is projected to increase by a factor of at least twenty from 2009 to 2014.[12] One way of making more efficient use of spectrum is to increase channel bandwidth. LTE-Advanced and WiMAX2 contemplate channel bandwidths up to 40-100 megahertz.[13]

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[3] *Id.* at 14213-14215 ¶¶ 124-130.

[4] *Id.* at 14215 ¶ 128. *See also* 47 C.F.R. § 27.53(m)(4).

[5] *See* 47 C.F.R. § 27.5(i)(2)(i), (iii).

[6] *See* Comments of Clearwire Corporation, RM-11614 (filed Dec. 6, 2010) (Clearwire Comments) at 1-2.

[7] *See generally* http://www.wimaxforum.org/resources/frequently-asked-questions (last visited Mar. 7, 2011).

[8] *See* http://www.3gpp.org/-About-3GPP- (last visited Mar. 7, 2011). *See also* WCAI Petition 2 n.3.

[9] *See* WiMAX2 Collaboration Initiative Frequently Asked Questions (Apr. 12, 2010) (available at http://www.wimaxforum.org/) and http://www.4gamericas.org/index.cfm?fuseaction=page&sectionid=352 (last visited Mar. 7, 2011).

[10] *See* Petition for Rulemaking, Wireless Communications Association, International, RM-11614 (filed Oct. 22, 2010) (WCAI Petition) at 3.

[11] *See* Clearwire's Big Bet on Broadband Addiction, GigaOM (Mar. 12, 2010) (available at http://gigaom.com/2010/03/12/clearwires-big-bet-on-our-broadband-addiction/) (last visited Mar. 7, 2011).

[12] *See* National Broadband Plan at Exhibit 5-A p. 76.

[13] *See* Report ITU-R M.2134, Requirements related to technical performance for IMT-Advanced radio interface(s) at 5 Section 4.3 (IMT Advanced Technologies "shall support a scalable bandwidth up to and including 40 MHz," and encouraging operation in bandwidths up to 100 megahertz). *See also* ITU paves way for next-generation 4G mobile technologies; ITU IMT-R Advanced 4G standards to usher new era of mobile broadband communications, *Press Release* (Oct. 21, 2010) (available at http://www.itu.int/net/pressoffice/press_releases/2010/40.aspx) (last visited Mar. 7, 2011) (designating LTE-Advanced and WiMAX2 as IMT-Advanced technologies).

5. *WCAI Petition*: On October 22, 2010, the Wireless Communications Association International (WCAI) filed a petition for rulemaking asking the Commission to revise the out-of-band emission limits for mobile digital stations operating in the BRS and EBS band to accommodate channel bandwidths of 20 megahertz and wider.[14] WCAI argues that these changes are necessary to permit operators to realize the full benefits of 4G technologies.[15] WCAI asserts that it is currently difficult for BRS/EBS devices to meet the out-of-band emission limits for 10 megahertz channels because of the limits of power amplifier efficiency inherent in current technology, and states that developing a smartphone that would fully use a 20 megahertz channel bandwidth that complies with the current out-of-band emission limits would be very difficult or impossible.[16]

6. Specifically, WCAI asks the Commission to increase the out-of-band emission limits for BRS and EBS mobile digital stations by modifying the attenuation factor that these devices must meet to the following:

- 40 + 10 log (P) dB at the channel edge, measured using a resolution bandwidth of 2 percent of the emission bandwidth of the fundamental emission in the 1 megahertz bands immediately outside and adjacent to the frequency block.
- 43 + 10 log (P) dB beyond 5 megahertz from the channel edges, and
- 55 + 10 log (P) dB attenuation factor at a distance of "X" megahertz from the channel edges, where "X" is the greater of 6 megahertz or the actual emission bandwidth as defined in Section 27.53(m)(6) of the Commission's rules.[17]

WCAI asserts that these changes would allow operators to provide the full uplink capacity available in 20 megahertz or wider channels,[18] and would harmonize the Commission's out-of-band emission limits with 3GPP standards for out-of-band emission limits in the 2.5 GHz band.

7. WCAI recognizes that its proposal would be a loosening of the out-of-band emission limits, but argues that the benefits of the rule change outweigh any increased risk of interference.[19] Further, WCAI argues that the revised rules will not significantly increase the risk of interference, because mobile 4G devices using orthogonal frequency-division multiple access (OFDMA) technology (on which WiMAX and LTE are based) are not typically allocated all of the uplink bandwidth while operating at full transmit power, the scenario that would maximize potential interference.[20] In addition, WCAI notes that mobile 4G devices operate under very stringent power controls in order to maximize battery life and minimize intra-system interference.[21] Typically, these devices operate at full power only at the edge of a

[14] WCAI Petition.

[15] *Id.* at 3.

[16] *Id.* at 4. According to WCAI, such a device would require additional filtering that would lessen battery life and would generate additional heat which would be difficult to dissipate. *Id.*

[17] *Id.* at 6. 47 C.F.R. § 27.53(m)(6) defines the emission bandwidth "as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power."

[18] WCAI Petition at 6.

[19] *Id.* at 6.

[20] *Id.* at 8.

[21] *Id.* at 6.

coverage area, and in these situations, operate in the narrowest bandwidth possible to maximize system range, while preserving battery life.[22] Thus, WCAI argues that system design limits the bandwidth that is typically used at full power, and hence the out of band emissions.[23]

8. *Comments*: Comments on the WCAI PFR were due December 6, 2010.[24] A number of parties support the proposed rule changes, including Clearwire, the largest BRS licensee and lessee of EBS spectrum and DigitalBridge Communications Corp., a mobile WiMAX provider; as well as equipment and component manufacturers including GCT Semiconductor, HTC America, Inc., Motorola, Inc., and Nokia Siemens Networks US LLC/Nokia Inc.[25] These parties assert that the proposed changes would allow wireless carriers to realize the full benefits of 4G technologies, offer a greater variety of services and applications, allow more efficient use of spectrum, and better align the Commission's rules with the approach of 3GPP and other standards bodies.[26] Clearwire reports that it can achieve speeds of 90 Mbps using paired 20 megahertz channels, a speed that cannot be reached using 10 megahertz channels.[27] The National EBS Association and the Catholic Television Network, organizations that represent EBS licensees, support seeking comment on the proposed change in order "to ensure that both educators and commercial operators continue to reap the benefits of changing technologies over time."[28]

9. Several parties filed comments opposing the proposed rule changes.[29] One concern raised in the oppositions is that the rule change will result in increased interference to service providers in adjacent spectrum bands. Globlastar, Inc. (Globalstar), which is authorized to operate a mobile satellite service (MSS) system with the downlink (satellite to mobile earth stations) in the 2483.5-2500 MHz band, asserts that the proposed change could cause significant harm to its MSS users, including consumers and public safety users.[30] Based on an engineering study submitted with its filing, Globalstar estimates that the proposed rule change would allow an increase of 3 dB in emissions in the 2490.5-2495 MHz band and a 12 dB increase in emissions in the 2483.5-2490.5 MHz band.[31] Globalstar claims that the proposed rule changes would create large "exclusion zones" where MSS handsets could not operate without receiving

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[22] *Id.*

[23] *Id.*

[24] *See* Consumer & Governmental Affairs Bureau Reference Information Center Petition for Rulemakings Filed, Report No. 2920, *Public Notice* (CGB RIC rel. Nov. 4, 2010). A list of commenters is attached as Appendix C.

[25] Alcatel Lucent also filed in support of opening a rulemaking to consider the proposed rule change. *See* Comments of Alcatel-Lucent, RM-11614 (filed Dec. 6, 2010) (Alcatel-Lucent Comments) at 3

[26] *See* Clearwire Comments at 3; Comments of DigitalBridge Communications Corp., RM-11614 (filed Dec. 6, 2010) at 2; Comments of GCI Semiconductor, RM-11614 (filed Dec. 6, 2010) at 2; Comments of HTC America, Inc., RM-11614 (filed Dec. 6, 2010) at 2; Comments of Nokia Siemens US LLC and Nokia Inc in Support of the Petition, RM-11614 (filed Dec. 6, 2010) at 2.

[27] Clearwire Comments at 2.

[28] Comments of The National EBS Association and the Catholic Television Network, RM-11614 (filed Dec. 6, 2010) at 2.

[29] Opposition of Globalstar, Inc., RM-11614 (filed Dec. 6, 2010) (Globalstar Opposition); Comments of EIBASS, RM-11614 (filed Dec. 1, 2010) (EIBASS Comments); Comments of IP Wireless, Inc., RM-11614 (filed Dec. 3, 2010) (IP Wireless Comments).

[30] Globalstar Opposition 2-5.

[31] *Id.* at 5-6 and Technical Appendix. While Globalstar may operate in the 2495-2500 MHz band, it must accept interference from BRS/EBS operations in that band. *See* 47 C.F.R. § 2.106 n. US391.

interference from BRS/EBS mobile devices.[32] Globalstar further argues that the problem is particularly acute, because interference is most likely to occur in remote areas at the edge of cell sites, where customers are most likely to rely on Globalstar's MSS services.[33] Similarly, Engineers for the Integrity of Broadcast Auxiliary Services Spectrum (EIBASS) are concerned that the proposed change could result in greater interference to Broadcast Auxiliary Services (BAS) operations operating on Channels A10 (2483.5-2500 MHz) and A9 (2467–2483.5 MHz).[34] With respect to the concerns raised by Globalstar and EIBASS, WCAI responds that those parties exaggerate the risk of interference, because the chances that BRS Channel 1 would be operating at full power across the entire bandwidth of the channel in the vicinity of Globalstar's mobile receivers and BAS Channels A9 or A10 receivers are very low.[35] WCAI argues that there has never been an interference complaint from Globalstar or BAS with respect to either adjacent-channel operations on BRS Channel 1.[36] WCAI further criticizes Globalstar's engineering study for making unrealistic assumptions.[37]

10. IP Wireless, Inc. (IP Wireless), a developer and manufacturer of 3GPP user equipment, opposes the rule changes proposed by WCAI because it does not believe changes are necessary to permit wider bandwidth operations.[38] IP Wireless asserts that it makes available LTE devices that can "easily" meet the FCC's existing out-of-band emission limits for mobile devices operating with 20 megahertz channels.[39] IP Wireless claims that the emission mask adopted by 3GPP has traditionally been used only for paired spectrum and that guard bands are recommended to achieve coexistence between FDD and TDD systems or between uncoordinated TDD systems.[40] According to IP Wireless, relaxing the out-of-band emission limits would waste spectrum by forcing operators to institute voluntary guard bands to prevent interference.[41] WCAI responds that IP Wireless is just one equipment supplier in a larger ecosystem and that other equipment manufacturers agree "that the mask proposed in the Petition represents an appropriate and reasonable trade-off between form factor, battery consumption, and

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[32] Globalstar Opposition at 6 and Technical Appendix. According to Globalstar, the "exclusion zone" could be as large as 24 kilometers if there are ten BRS/EBS handsets operating at the edge of cell sites. *Id.*, Technical Appendix at 2.

[33] *Id.* at 6-7.

[34] EIBASS Comments at 1-2. EIBASS references and requests action on a pending petition for reconsideration filed by the Society of Broadcast Engineers pending in IB Docket No. 02-364 concerning the protection of BAS licensees operating on Channel A10, which overlaps with EBS Channel A1 (2496-2502 MHz), and a proposal to relocate licensees operating on BAS Channels A8-A10. *Id.* at 3-4, *referencing* Society of Broadcast Engineers Petition for Reconsideration, IB Docket No. 02-364 (filed May 22, 2006) at 2-3.

[35] Reply Comments, Wireless Communications Association International (filed Dec. 16, 2010) (WCAI Reply) at 5-7. *See* ¶ 7, *supra*.

[36] WCAI Reply at 6-7.

[37] *Id. at* 8-9.

[38] IP Wireless Comments at 3-4.

[39] *Id.*

[40] *Id.* at 2; *citing* Report from the European Conference of Postal and Telecommunications Administrations to the European Commission in response to the Mandate to develop least restrictive technical conditions for frequency bands addressed in the context of WAPECS, ECPT Report 19 (Oct. 30, 2008) (CEPT Report 19) at 41 (available at http://www.erodocdb.dk/Docs/doc98/official/pdf/CEPTREP019.PDF).

[41] IP Wireless Comments at 4-5.

performance, especially for the most challenging type of device: highly integrated smartphones with multiple radios."[42]

III. DISCUSSION

11. We find that facilitating the use of wider channels in the 2.5 GHz spectrum band would greatly enhance spectrum efficiency and throughput in wireless broadband systems operating in the band. We also find that the opportunity to harmonize the Commission's rules with international standards could benefit both operators and consumers by encouraging the development of mobile broadband equipment for the 2.5 GHz band at lower cost. For these reasons, we initiate this rulemaking on WCAI's proposal to change the out-of-band emission limits for mobile devices for BRS and EBS.

12. Specifically, we seek comment on whether to modify the out-of-band emission limits for BRS and EBS mobile digital stations by modifying the factors by which these devices' emissions outside the licensee's frequency bands of operation must be attenuated below the transmitter power (P), in Watts, to the following, as requested by WCAI:

- 40 + 10 log (P) dB at the channel edge, measured using a resolution bandwidth of 2 percent of the emission bandwidth of the fundamental emission in the 1 megahertz bands immediately outside and adjacent to the frequency block.
- 43 + 10 log (P) dB beyond 5 megahertz from the channel edges, and
- 55 + 10 log (P) dB attenuation factor at a distance of "X" megahertz from the channel edges, where "X" is the greater of 6 megahertz or the actual emission bandwidth as defined in Section 27.53(m)(6) of the Commission's rules.[43]

13. We seek comment on the proposed revisions mindful of the concerns raised by opponents. In particular, we seek comment on whether the proposed rule change is necessary to permit mobile devices to operate in the 2.5 GHz band using channel bandwidths wider than 10 megahertz. As noted above, IP Wireless claims to have equipment capable of operating on 20 megahertz channels that meets the FCC's current out-of-band emission limits,[44] but a number of other equipment manufacturers and operators support the proposed rule change. WCAI has argued that it will be particularly difficult to design smartphone devices with small form factors that can use 20 megahertz channels and meet the current OOBE requirements,[45] and asserts that IP Wireless does not offer any handset devices.[46] Does the existence of some mobile devices capable of operating on 20 megahertz channels and meeting the current FCC OOBE rules affect the necessity or desirability of making the proposed rule changes?

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[42] WCAI Reply at 10. WCAI also makes two other arguments that IP Wireless claims are based on false factual predicates. First, WCAI claims that IP Wireless does not make a device using 20 megahertz channels. WCAI Reply at 10. According to IP Wireless, it does offer a USB stick modem using 20 megahertz channels. *See* Letter from Roger Quayle, CTO, IP Wireless, Inc. to Marlene H. Dortch, Secretary, Federal Communications Commission (filed Dec. 21, 2010) (IP Wireless December 21 *ex parte*) at 1. WCAI also argues that rejecting its petition would force operators "to implement proprietary extensions of LTE, like that employed by IPWireless . . ." WCAI Reply at 11. IP Wireless responds that the device discussed in its comments did not use proprietary technology and was commercially available in Europe. IP Wireless December 21 *ex parte* at 2.

[43] The proposed rules are attached as Appendix A.

[44] IP Wireless Comments at 3.

[45] WCAI Petition at 5.

[46] WCAI Reply at 10-11.

14. We note that IP Wireless also argues that the proposed rule changes will result in insufficient protection against interference within the 2.5 GHz band. Specifically, it claims that the more permissive 3GPP emissions standard on which the proposed rule changes are modeled has traditionally been applied to paired (Frequency Division Duplex (FDD)) spectrum allocations, and cites a CEPT report for support that coexistence between FDD and Time Division Duplex (TDD) systems in adjacent spectrum, or between uncoordinated TDD systems, is generally achieved by a combination of the 3GPP emissions standards and guard bands.[47] However, the CEPT report notes that the block edge mask limits it proposed were developed in order to manage the risk of harmful interference independently of any relaxation which may be achieved through mitigation techniques or coordination.[48] We seek comment on how adoption of the proposed rule changes would affect the likelihood of interference within the 2.5 GHz band and whether additional protections against such interference would be needed. In that regard, we note that our existing rules contain a provision requiring both licensees to comply with a tighter emission mask for its base stations within 60 days of receiving a documented interference complaint from an adjacent channel licensee.[49] Since mobile devices and base stations operate in the same frequency band in TDD systems, and base stations operate with higher power, it appears that the existing provisions in our rules may protect adjacent channel licensees with protection against adjacent channel interference. We seek further comment on this issue.

15. We further seek comment on whether adopting WCAI's requested OOBE limits would increase the potential for harmful interference into the MSS and BAS bands, as Globalstar and EIBASS contend. The Commission has previously said that the BRS/EBS out-of-band emission limits "should allow MSS providers to operate without unnecessary restrictions or significant interference in the 2483.5-2495 MHz band."[50] The same considerations apply to adjacent band BAS operations. As noted above, Globalstar, EIBASS and WCAI disagree about whether the proposed rule changes could result in increased interference into services below 2495 MHz,[51] the likelihood that such interference could result,[52] and the harms that could result from such interference.[53] In view of these disputes in the record, we seek comment including detailed engineering analyses on the potential for, and likelihood that, the proposed rule changes will result in harmful interference into MSS and BAS operations below 2495 MHz. In this vein, we seek comment on the assumptions used by Globalstar in its engineering study, including its definition of interference as a signal level above -133 dBm/MHz.[54] We also seek additional

[47] IP Wireless Comments at 2, *citing* to Report from the European Conference of Postal and Telecommunications Administrations (CEPT) to the European Commission in response to the Mandate to develop least restrictive technical conditions for frequency bands addressed in the context of WAPECS, 21 December 2007.

[48] *See* CEPT Report 19 at 41 which states that "It is important to note that an appropriate licensing regime based on the cooperation between operators and sharing information on the frequency use for WAPECS systems may facilitate a better usage of the spectrum ensuring a flexible and efficient use of the spectrum resource notably with the opportunity for users to relax technical limitations based on mutual agreement. Nevertheless, the proposed BEM in annex 4 were developed in order to manage the risk of harmful interference independently of the relaxation which may be achieved according to some mitigation techniques or coordination."

[49] *See* 47 C.F.R. § 27.53(m)(2)(i)-(iv).

[50] *See* Review of the Spectrum Sharing Plan Among Non-Geostationary Satellite Orbit Mobile Satellite Service Systems in the 1.6/2.4 GHz Bands, *et al.*, IB Docket No. 02-364, ET Docket No. 00-258, *Report and Order, Fourth Report and Order and Further Notice of Proposed Rulemaking*, 19 FCC Rcd 13356, 13389 ¶ 74 (2004).

[51] *Compare* Globalstar Opposition at 5-7 *and* EIBASS Comments at 1-2 *with* WCAI Reply at 6-7.

[52] *Compare* Globalstar Opposition at 6-7 *and* EIBASS Comments at 2-3 *with* WCAI Reply at 5-8.

[53] *Compare* Globalstar Opposition at 6 *with* WCAI Reply at 9.

[54] *See* Globalstar Technical Appendix at 2.

engineering analyses related to the potential for interference, in which the key assumptions underlying the analysis are identified, and accompanied by an explanation of why these assumptions are appropriate. We also seek comment on the significance of the fact that MSS licensees can file documented interference complaints against adjacent channel licensees and take advantage of the provisions that could require adjacent channel BRS licensees to comply with tighter base station emission masks.[55]

16. In addition, we seek comment on whether, in connection with the proposed rule changes, we should consider adopting additional measures of protecting against interference to adjacent bands.[56] For example, we seek comment on the desirability and feasibility of establishing a fixed limit on out-of-band emissions below 2495 MHz or above 2690 MHz in order to protect adjacent bands' operations.[57]

17. While the WCAI Petition and comments discuss the use of 20 megahertz channels, the proposed rule is not limited to 20 megahertz channels, and developing standards contemplate the use of wider channels. We seek comment on whether the proposed rule would work for channels wider than 20 megahertz without causing interference to adjacent bands' operations, or whether we should set a maximum channel size to which the proposed out-of-band emission limits would apply. In addition, while the proposed rule change relies on standards being developed by 3GPP, we seek comment on whether, to the extent such information is available, the proposed changes would be consistent with IEEE's continuing development of WiMAX2, as well as other evolving standards. Finally, we seek comment on whether any additional changes to the OOBE limits applicable to mobile devices in the 2.5 GHz band are necessary or desirable to promote greater efficiency and flexibility in the provision of broadband services in these bands?

IV. PROCEDURAL MATTERS

A. *Ex Parte* Rules – Permit-But-Disclose

18. This is a permit-but-disclose notice and comment rulemaking proceeding. *Ex parte* presentations are permitted, except during the Sunshine Agenda period, provided they are disclosed pursuant to the Commission's rules.[58]

B. Comment Period and Procedures

19. Pursuant to Sections 1.415 and 1.419 of the Commission's rules, 47 CFR §§ 1.415, 1.419, interested parties may file comments and reply comments on or before the dates indicated on the first page of this document. Comments may be filed using: (1) the Commission's Electronic Comment Filing System (ECFS), (2) the Federal Government's eRulemaking Portal, or (3) by filing paper copies. *See* Electronic Filing of Documents in Rulemaking Proceedings, 63 FR 24121 (1998).

20. *Electronic Filers*: Comments may be filed electronically using the Internet by accessing the ECFS: http://www.fcc.gov/cgb/ecfs/ or the Federal eRulemaking Portal: http://www.regulations.gov.

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[55] *See* 47 C.F.R. § 27.53(m)(2).

[56] We agree with WCAI that the issue of relocating BAS Channels A8, A9, and A10 and SBE's petition for reconsideration in IB Docket No. 02-364 should be considered separately from this petition. The primary issue raised by that petition is the co-channel compatibility of BRS Channel 1 and BAS Channel A10. Regardless of whether BAS Channels A8-A10 are relocated, we will examine in this proceeding whether BAS would receive sufficient adjacent band interference protection under the proposed rule change.

[57] For example, establishing a fixed limit of 55 + 10 log(p) dB at and below 2490.5 MHz (5.5 megahertz from 2496 MHz, the bottom of the BRS/EBS band) would provide much of the protection provided for under the current rules.

[58] *See generally* 47 C.F.R. §§ 1.1202, 1.1203, 1.1206.

Filers should follow the instructions provided on the website for submitting comments. All comments shall be filed in WT Docket No. 03-66. In completing the transmittal screen, filers should include their full name, U.S. Postal Service mailing address, and the applicable docket or rulemaking number. Parties may also submit an electronic comment by Internet e-mail. To get filing instructions, filers should send an e-mail to ecfs@fcc.gov, and include the following words in the body of the message, "get form." A sample form and directions will be sent in response.

21. *Paper Filers*: Parties who choose to file by paper must file an original and four copies of each filing. Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail (although we continue to experience delays in receiving U.S. Postal Service mail). All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission. The Commission's contractor will receive hand-delivered or messenger-delivered paper filings for the Commission's Secretary at 236 Massachusetts Avenue, NE, Suite 110, Washington, DC 20002. The filing hours at this location are 8:00 a.m. to 7:00 p.m. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes must be disposed of before entering the building. Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9300 East Hampton Drive, Capitol Heights, MD 20743. U.S. Postal Service first-class, Express, and Priority mail must be addressed to 445 12th Street, SW, Washington DC 20554.

22. *People with Disabilities*: To request materials in accessible formats for people with disabilities (braille, large print, electronic files, audio format), send an e-mail to fcc504@fcc.gov or call the Consumer & Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (tty).

23. The public may view the documents filed in this proceeding during regular business hours in the FCC Reference Information Center, Federal Communications Commission, 445 12th Street, S.W., Room CY-A257, Washington, D. C. 20554, and on the Commission's Internet Home Page: <http://www.fcc.gov>. Copies of comments and reply comments are also available through the Commission's duplicating contractor: Best Copy and Printing, Inc., 445 12th Street, SW, Room CY-B402, Washington, DC, 20554, 1-800-378-3160.

C. Initial Regulatory Flexibility Analysis

24. As required by the Regulatory Flexibility Act of 1980 (RFA),[59] the Commission has prepared an Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on small entities of the policies and rules proposed in the *NPRM* portion of this document. The analysis is found in Appendix B. We request written public comment on the analysis. Comments must be filed by the same dates as listed in the first page of this document, and must have a separate and distinct heading designating them as responses to the IRFA. The Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, will send a copy of this *NPRM*, including the IRFA, to the Chief Counsel for Advocacy of the Small Business Administration.

D. Paperwork Reduction Analysis

25. This document does not contain proposed information collection requirements subject to the Paperwork Reduction Act of 1995, Public Law 104-13. In addition, therefore, it does not contain any proposed information collection burden "for small business concerns with fewer than 25 employees,"

[59] 5 U.S.C. § 603.

pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, *see* 44 U.S.C. § 3506(c)(4).

E. Further Information

26. For further information contact John J. Schauble of the Wireless Telecommunications Bureau, Broadband Division, at 202-418-0797 or by e-mail to John.Schauble@fcc.gov.

V. ORDERING CLAUSES

27. Accordingly, IT IS ORDERED that NOTICE IS HEREBY GIVEN of the proposed regulatory changes described in this *Fourth Further Notice of Proposed Rulemaking*, and that comment is sought on these proposals.

28. IT IS FURTHER ORDERED pursuant to Section 4(i) of the Communications Act of 1934, 47 U.S.C. § 154(i), that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of this *Fourth Further Notice of Proposed Rulemaking*, including the Final Regulatory Certification and the Initial Regulatory Certification, to the Chief Counsel for Advocacy of the Small Business Administration.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch

Marlene H. Dortch
Secretary

APPENDIX A

Proposed Rules

For the reasons discussed in the preamble, the Federal Communications Commission proposes to amend Part 27 of Title 47 as follows:

I. PART 27 – MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES

1. The authority citation for Part 27 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 301, 302, 303, 307, 309, 332, 336, and 337 unless otherwise noted.

2. Amend § 27.53 by revising paragraphs (m)(4) and (m)(6) to read as follows:

§ 27.53 Emission Limits.

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(m) * * *

(4) For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB at the channel edge, 43 + 10 log (P) dB beyond 5MHz from the channel edges, and 55 + 10 log (P) dB at X MHz from the channel edges, where X is the greater of 6 MHz or the actual emission bandwidth as defined in § 27.53(m)(6). Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

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(6) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent (or two percent for mobile digital stations) of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.*, 1 megahertz). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. With respect to television operations, measurements must be made of the separate visual and aural operating powers at sufficiently frequent intervals to ensure compliance with the rules.

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APPENDIX B

Initial Regulatory Flexibility Analysis

As required by the Regulatory Flexibility Act of 1980, as amended (RFA),[1] the Commission has prepared this present Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on a substantial number of small entities by the policies and rules proposed in this *Fourth Further Notice of Proposed Rulemaking* (*4th FNPRM*). Written public comments are requested on this IRFA. Comments must be identified as responses to the IRFA and must be filed by the deadlines specified in the *4th NPRM* for comments. The Commission will send a copy of this *4th FNPRM*, including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration (SBA).[2] In addition, the *4th FNPRM* and IRFA (or summaries thereof) will be published in the Federal Register.[3]

A. Need for, and Objectives of, the Proposed Rules

In this *4th FNPRM*, we seek comment on changing the out-of-band emission limits, which limit the amount of energy that can be radiated outside a licensee's authorized bandwidth, for mobile devices operating in the Broadband Radio Service (BRS) and Educational Broadband Service (EBS) in the 2496-2690 MHz band (2.5 GHz band). The proposed change is designed to facilitate the use of wider channel bandwidths, which could potentially allow higher data rates and more efficient use of spectrum. Such a change would increase the range of applications and devices that can benefit from mobile broadband connectivity, generating a corresponding increase in demand for mobile broadband service from consumers, businesses, public safety, health care, education, energy and other public safety uses. The proposed change is also designed to facilitate harmonization of future standards in the equipment market for mobile devices in the 2.5 GHz band, which would make equipment more affordable and further the development of advanced wireless broadband devices. We seek comment on whether the proposed changes can be made without any increase in the potential for harmful interference to existing users in the 2.5 GHz band and adjacent bands. We also consider establishing an additional requirement of fixed interference limits below 2496 MHz and above 2690 MHz in order to protect adjacent band users.

B. Legal Basis

The proposed action is authorized pursuant to sections 1, 2, 4(i), 7, 10, 201, 214, 301, 302, 303, 307, 308, 309, 310, 319, 324, 332 and 333 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 152, 154(i), 157; 160, 201, 214, 301, 302, 303, 307, 308, 309, 310, 319, 324, 332, and 333.

C. Description and Estimate of the Number of Small Entities To Which the Proposed Rules Will Apply

The RFA directs agencies to provide a description of, and, where feasible, an estimate of the number of small entities that may be affected by the proposed rules and policies, if adopted.[4] The RFA generally defines the term "small entity" as having the same meaning as the terms "small business,"

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[1] *See* 5 U.S.C. § 603. The RFA, *see* 5 U.S.C. § 601-612, has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996, (SBREFA) Pub. L. No. 104-121, Title II, 110 Stat. 857 (1996).

[2] *See* 5 U.S.C. § 603(a).

[3] *See* 5 U.S.C. § 603(a).

[4] 5 U.S.C. § 603(b)(3).

"small organization," and "small governmental jurisdiction."[5] In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.[6] A "small business concern" is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the SBA.[7]

Broadband Radio Service and Educational Broadband Service. Broadband Radio Service systems, previously referred to as Multipoint Distribution Service (MDS) and Multichannel Multipoint Distribution Service (MMDS) systems, and "wireless cable," transmit video programming to subscribers and provide two-way high speed data operations using the microwave frequencies of the Broadband Radio Service (BRS) and Educational Broadband Service (EBS) (previously referred to as the Instructional Television Fixed Service (ITFS)).[8] In connection with the 1996 BRS auction, the Commission established a small business size standard as an entity that had annual average gross revenues of no more than $40 million in the previous three calendar years.[9] The BRS auctions resulted in 67 successful bidders obtaining licensing opportunities for 493 Basic Trading Areas (BTAs). Of the 67 auction winners, 61 met the definition of a small business. BRS also includes licensees of stations authorized prior to the auction. At this time, we estimate that of the 61 small business BRS auction winners, 48 remain small business licensees. In addition to the 48 small businesses that hold BTA authorizations, there are approximately 392 incumbent BRS licensees that are considered small entities.[10] After adding the number of small business auction licensees to the number of incumbent licensees not already counted, we find that there are currently approximately 440 BRS licensees that are defined as small businesses under either the SBA or the Commission's rules. In 2009, the Commission conducted Auction 86, the sale of 78 licenses in the BRS areas.[11] The Commission offered three levels of bidding credits: (i) a bidder with attributed average annual gross revenues that exceed $15 million and do not exceed $40 million for the preceding three years (small business) will receive a 15 percent discount on its winning bid; (ii) a bidder with attributed average annual gross revenues that exceed $3 million and do not exceed $15 million for the preceding three years (very small business) will receive a 25 percent discount on its winning bid; and (iii) a bidder with attributed average annual gross revenues that do not exceed $3 million for the preceding three years (entrepreneur) will receive a 35 percent discount on its winning

[5] 5 U.S.C. § 601(6).

[6] 5 U.S.C. § 601(3) (incorporating by reference the definition of "small-business concern" in the Small Business Act, 15 U.S.C. § 632). Pursuant to 5 U.S.C. § 601(3), the statutory definition of a small business applies "unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register."

[7] 15 U.S.C. § 632.

[8] *Amendment of Parts 21 and 74 of the Commission's Rules with Regard to Filing Procedures in the Multipoint Distribution Service and in the Instructional Television Fixed Service and Implementation of Section 309(j) of the Communications Act—Competitive Bidding*, MM Docket No. 94-131, PP Docket No. 93-253, Report and Order, 10 FCC Rcd 9589, 9593 ¶ 7 (1995).

[9] 47 C.F.R. § 21.961(b)(1) (1996).

[10] 47 U.S.C. § 309(j). Hundreds of stations were licensed to incumbent MDS licensees prior to implementation of Section 309(j) of the Communications Act of 1934, 47 U.S.C. § 309(j). For these pre-auction licenses, the applicable standard is SBA's small business size standard of 1500 or fewer employees.

[11] Auction of Broadband Radio Service (BRS) Licenses, Scheduled for October 27, 2009, Notice and Filing Requirements, Minimum Opening Bids, Upfront Payments, and Other Procedures for Auction 86, *Public Notice*, 24 FCC Rcd 8277 (2009).

bid.[12] Auction 86 concluded in 2009 with the sale of 61 licenses.[13] Of the ten winning bidders, two bidders that claimed small business status won 4 licenses; one bidder that claimed very small business status won three licenses; and two bidders that claimed entrepreneur status won six licenses.

In addition, the SBA's Cable Television Distribution Services small business size standard is applicable to EBS. There are presently 2,032 EBS licensees. All but 100 of these licenses are held by educational institutions. Educational institutions are included in this analysis as small entities.[14] Thus, we estimate that at least 1,932 licensees are small businesses. Since 2007, Cable Television Distribution Services have been defined within the broad economic census category of Wired Telecommunications Carriers; that category is defined as follows: "This industry comprises establishments primarily engaged in operating and/or providing access to transmission facilities and infrastructure that they own and/or lease for the transmission of voice, data, text, sound, and video using wired telecommunications networks. Transmission facilities may be based on a single technology or a combination of technologies."[15] The SBA has developed a small business size standard for this category, which is: all such firms having 1,500 or fewer employees. To gauge small business prevalence for these cable services we must, however, use the most current census data that are based on the previous category of Cable and Other Program Distribution and its associated size standard; that size standard was: all such firms having $13.5 million or less in annual receipts.[16] According to Census Bureau data for 2002, there were a total of 1,191 firms in this previous category that operated for the entire year.[17] Of this total, 1,087 firms had annual receipts of under $10 million, and 43 firms had receipts of $10 million or more but less than $25 million.[18] Thus, the majority of these firms can be considered small.

D. Description of Projected Reporting, Recordkeeping, and other Compliance Requirements

This *4th FNPRM* imposes no new reporting or recordkeeping requirements.

E. Steps taken to Minimize Significant Economic Impact on Small Entities, and Significant Alternatives Considered

The only potential burden on small entities that hold BRS or EBS licenses is a potential increase in interference to existing users in the 2.5 GHz band. We believe this potential burden would be outweighed by benefits to small businesses that hold BRS and EBS licensees, who would be able to use wider channel bandwidths to provide faster service and use their spectrum more efficiently. An

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[12] *Id.* at 8296.

[13] Auction of Broadband Radio Service Licenses Closes, Winning Bidders Announced for Auction 86, Down Payments Due November 23, 2009, Final Payments Due December 8, 2009, Ten-Day Petition to Deny Period, *Public Notice*, 24 FCC Rcd 13572 (2009).

[14] The term "small entity" within SBREFA applies to small organizations (nonprofits) and to small governmental jurisdictions (cities, counties, towns, townships, villages, school districts, and special districts with populations of less than 50,000). 5 U.S.C. §§ 601(4)–(6). We do not collect annual revenue data on EBS licensees.

[15] U.S. Census Bureau, 2007 NAICS Definitions, "517110 Wired Telecommunications Carriers," (partial definition), www.census.gov/naics/2007/def/ND517110.HTM#N517110.

[16] 13 C.F.R. § 121.201, NAICS code 517110.

[17] U.S. Census Bureau, 2002 Economic Census, Subject Series: Information, tbl. 4, Receipts Size of Firms for the United States: 2002, NAICS code 517510 (rel. November 2005).

[18] *Id.* An additional 61 firms had annual receipts of $25 million or more.

alternative being considered in order to minimize any potential burden is establishing fixed interference limits below 2496 MHz and above 2690 MHz in order to protect adjacent band users.

The other main alternative would be to maintain the existing rules. If we maintained the existing rules, it would be more difficult or impossible for BRS and EBS operators to offer broadband systems with higher data rates by using wider channel bandwidths. Such difficulty would make it more difficult for BRS and EBS operators, including small entities, to be competitive with other broadband providers.

APPENDIX C

List of Commenters in Response to Petition for Rulemaking, RM-11614

Petition for Rulemaking
Wireless Communications Association International, Inc. (WCAI)

Comments on Petition for Rulemaking
Alcatel Lucent
Clearwire Corporation (Clearwire)
DigitalBridge Communications Corp. (DigitalBridge)
Engineers for the Integrity of Broadcast Auxiliary Services Spectrum (EIBASS)
GCT Semiconductor
Globalstar, Inc. (Globalstar)
HTC America, Inc. (HTC)
IP Wireless, Inc. (IP Wireless)
Motorola, Inc. (Motorola)
National EBS Association (NEBSA) and Catholic Television Network (CTN)
Nokia Siemens Networks US LLC (Nokia Siemens Networks) and Nokia Inc. (Nokia)

Reply Comment
WCAI

Ex Parte
IP Wireless